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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/773,704	01/31/2001	Daniel O. Jones	PLUG-0056-US (734)	7911

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EXAMINER	
ALEJANDRO, RAYMOND	
ART UNIT	PAPER NUMBER
1745	4

DATE MAILED: 09/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/773,704	JONES ET AL.	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *9-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 May 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-8, drawn to a method usable with a fuel cell, classified in class 429, subclass 13.

II. Claims 9-18, drawn to a fuel cell system, classified in class 429, subclass 23.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by another materially different apparatus or by hand, for example, the method can be used for operate an internal combustion engine or a chemical reactor, or a fuel cell not having a fuel processor itself.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. Because these inventions are distinct for the reasons given above and the search required for one group is not required for other group, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Fred G. Pruner on 09/25/02 a provisional election was made without traverse to prosecute the invention of Group I, claim 1-8. Affirmation of this

election must be made by applicant in replying to this Office action. Claims 9-18 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Oath/Declaration

7. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:
It does not identify the citizenship of each inventor (the second inventor).

Drawings

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 56-57. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. Claim 7 recites the limitation "the load" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is noted that claim 1 recites "a first load" and "a second load", thereby is unclear as to what particular load the claim is intended to recite.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonnefoy 5714874 in view of the European publication EP 782209.

Regarding claims 1, 3-4:

Bonnefoy discloses a fuel cell voltage generator wherein the voltage generator is to be connected to a current load; a fuel cell for generating electrical energy to be used by the current load; a storage battery having and control means for modifying a maximum intensity value of the

current flowing through the dc converter in accordance with a voltage measured at the terminals of the fuel cell to keep said voltage within a predetermined range, at which a power output of the fuel cell is maximum (claims 1, 2, 5-6). It is further disclosed that if the load requires an electric power lower than the one available at the fuel cell, the battery takes profit from the excess of the electric energy (col 2, lines 58-60). It is also disclosed that this invention aims at supplying a voltage generator in which the fuel cell is kept continuously in optimal working conditions, regardless of the load demand, the fuel cell supplies continuously a maximum electric power (col 1, lines 35-40). *Since Bonnefoy teaches the working principle of the fuel cell generator, his teachings thus encompasses the operating method.*

It is further disclosed that the control block is divided in two parts, a firs part, grouping all the means necessary for the working control of the fuel cell such as hydrogen supply (mass of fuel), its temperature control and etc, and comprising the control means of the converter (col 2, lines 40-45). It is further taught that as the fuel cell begins to generate enough electric power, it replaces progressively the battery so as to become the only energy source of the generator, it then also supplies the control block (col 2, lines 54-57).

As to claim 6-7:

It is disclosed that the control means includes means for measuring the voltage at the terminals of the fuel cell, and wherein the control means respectively increments and decrements the maximum intensity value of the current following through the dc converter when the voltage measured of the fuel cell is above and below said predetermined range; wherein said predetermined range corresponds to a voltage range at which a power output of the fuel cell is maximum (claims 3-4). It is also made known that, in practice, the reference value of the voltage

at the fuel cell is determined as being the point of the voltage/current characteristic of the fuel cell corresponding to a maximum power output in normal working conditions of the fuel cell (col 1, lines 59-63).

Bonnefoy discloses a fuel cell voltage generator according to the foregoing. However, Bonnefoy does not expressly selectively routing some of the power produced by the fuel cell stack and not consumed by the first load to the second load.

As for claims 1 and 2:

The EP'209 publication teaches a supply system with fuel cells and a buffer in which the fuel cell has an output voltage lower than the voltage of the buffer battery (claim 2). It is also disclosed that the this enable the power delivered by the fuel cells to the load to be controlled simply, precisely and effectively without need to control the voltage output in any way in order to adjust it to the voltage actually present at the terminals of the battery and to the load requirement (page 4, lines 18-23). It is further taught that since the voltage pulses applied to the primary cannot exceed the minimum voltage output by the fuel cell and the maximum battery voltage is greater, it is necessary that the ratio between the maximum battery voltage and the minimum voltage delivered by the fuel cell is preferably of the order to twice the ratio between the mean value of the battery voltage and the mean value of the voltage delivered by the fuel cells. (page 4, lines 24-29).

As to claims 5 and 7:

It is also disclosed that for power values greater than a specific maximum power which can be delivered by the fuel cell power, the power delivered by the fuel cell is kept constant and equal to the specific maximum power so as to make a maximum contribution to the load

requirement. For load power less than the specific maximum, the power delivered by the fuel cell is made to depend upon the charge state of the battery; in particular, if the battery voltage indicates a fully charged condition, the power delivered by the cell is equal to the load power; if the battery voltage is lower than thus indicates a partial charge condition, the regulation band is proportional and is displaced in accordance with the lower voltage so as to deliver a recharging power to the battery (page 6, lines 19-35). The portions of the regulation characteristics which are disposed indicate that the power for recharging the battery is the accumulation of a negative load power (recovered from the load) and a power delivered by the fuel cell, which vary inversely maintaining a predetermined and constant recharging power which depends upon the battery voltage and hence upon its charge condition (page 6, lines 30-35).

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to selectively routing some of the power produced by the fuel cell stack and not consumed by the first load to the second load of Bonnefoy as the EP'209 publication discloses that this enable the power delivered by the fuel cells to the load to be controlled simply, precisely and effectively without need to control the voltage output in any way in order to adjust it to the voltage actually present at the terminals of the battery and to the load requirement. Accordingly, it solves a technical problem and provides a supply system with fuel cells and a buffer battery in which a highly efficient, very safe and extremely simply electronic regulation system forms the interface and ensures optimal performance of the drive system, particularly, it limits the current of the fuel cells to a maximum permitted design value; it regulates the power delivered by the fuel cells in dependence on the charge state of the batteries and on the power required by the load; it limits the rate of increase of the power delivered by the

cells to permissible values; and it adjusts the voltage output by the fuel cells to a higher battery voltage.

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bonnefoy 5714874 in view of the European publication EP 782209 as applied to claim 1 above, and further in view of Hauer 6214484.

Bonnefoy and the EP'209 publication are applied, argued and incorporated herein for the reasons above. In addition, the foregoing prior art fails to disclose the fuel processor to provide the fuel flow.

Hauer teaches a fuel cell arrangement having a fuel cell stack, a methanol reformer (fuel processor) wherein the fuel cell stack is connected with an electrical energy storage device (abstract).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use a fuel processor (reformer) to provide fuel to the fuel cell method of Bonnefoy and the EP'209 publication as Hauer teaches that the fuel processor converts raw fuel into reformed hydrogen which is the specific fuel employed to generate electrical energy from a fuel cell system. As it is conventionally known in the art, very efficient fuel cells use pure hydrogen for fuel; and pure hydrogen, has traditionally been difficult to handle and relatively expensive to store and distribute. Consequently, fuel processors process and provide the required hydrogen rich gas mixtures from reforming of various hydrocarbons fuels which are expected to be utilized in fuel cell systems.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (703) 308-0756. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745

Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700